WHAT IS CLAIMED IS:

1. A DPSK receiver to receive a DPSK signal transmitted by a DPSK transmitter, comprising:

means for converting the input signal to in-phase and quadrature components;

a differential demodulator to determine a demodulated phase by comparing the in-phase and quadrature components with a first delayed, conjugated version of the in-phase and quadrature components;

a frequency offset calculation circuit to determine a frequency offset between an oscillator in the DPSK receiver and an oscillator in the DPSK transmitter by comparing the inphase and quadrature components with a second delayed, conjugated version of the in-phase and quadrature components;

a frequency correction circuit to correct the demodulated phase using the frequency offset into a corrected phase;

a phase correction circuit to determine an absolute phase using the corrected phase; and a symbol mapping circuit to map the absolute phase to an output symbol, comprising one or more bits of data.

- 2. The DPSK receiver recited in claim 1, comprising a glitch filter to filter the frequency offsets to remove noise and glitches caused by phase transients between symbols.
- 3. The DPSK receiver recited in claim 1, wherein the delay associated with the first delayed version of the I and Q components in the differential demodulator is approximately one symbol interval.
- 4. The DPSK receiver recited in claim 1, wherein the delay associated with the second version of the I and Q components in the frequency offset calculation circuit is approximately one sample interval.

- 5. The DPSK receiver recited in claim 1, further comprising an optimal sample calculation circuit to determine an optimal sample to use to determine the demodulated phase and the frequency offset.
- 6. The DPSK receiver recited in claim 5, wherein the optimal sample calculation circuit determines the optimal sample as the sample associated with a peak amplitude of the combined in-phase and quadrature components of each sample in each symbol interval.
- 7. The DPSK receiver recited in claim 5, comprising a glitch filter to filter the frequency offsets to remove noise and glitches caused by phase transients between symbols.
- 8. A method for demodulating a DPSK signal, comprising:receiving the DPSK signal;digitizing the DPSK signal;

converting the DPSK signal into its corresponding in-phase (I) and quadrature (Q) components;

filtering the I and O components to remove noise;

determining a phase associated with the I and Q components by comparing the I and Q components to a first delayed and conjugated version of the I and Q components;

determining a frequency offset associated with the I and Q components by comparing the I and Q components to a second delayed and conjugated version of the I and Q components; adjusting the determined phase using the determined frequency offset; converting the adjusted phase to an absolute phase; and mapping the absolute phase to a symbol corresponding to one or more data bits.

9. The method recited in claim 8, wherein the step of determining the phase further comprises delaying the I and Q components by approximately one symbol interval and reversing

the sign of the Q component to generate the first delayed and conjugated version of the I and Q components.

- 10. The method recited in claim 8, wherein the step of determining the frequency offset comprises delaying the I and Q components by approximately one sample interval and reversing the sign of the Q component to generate the second delayed and conjugated version of the I and Q components.
- 11. The method recited in claim 8, further comprising removing glitches caused by phase transients between symbols.
- 12. The method recited in claim 8, further comprising determining an optimal sample to use in the steps of the determining the phase and frequency offset.
- 13. The method recited in claim 12, further comprising:
 calculating an amplitude for each sample in a symbol interval; and
 selecting the sample corresponding to the greatest amplitude as the optimal sample.
- 14. The method recited in claim 12, further comprising removing glitches caused by phase transients between symbols.
- 15. A system for demodulating a DPSK signal, comprising:means for converting the DPSK signal into its corresponding in-phase (I) and quadrature(Q) components;

means for filtering the I and Q components to remove noise;

means for determining a phase associated with the I and Q components by comparing the I and Q components to a first delayed and conjugated version of the I and Q components;

means for determining a frequency offset associated with the I and Q components by comparing the I and Q components to a second delayed and conjugated version of the I and Q components;

means for adjusting the determine phase using the determined frequency offset;

means for converting the adjusted phase to an absolute phase; and

means for mapping the absolute phase to a symbol corresponding to one or more data
bits.

- 16. The system recited in claim 15, further comprising means for delaying the I and Q components by approximately one symbol interval and reversing the sign of the Q component to generate the first delayed and conjugated version of the I and Q components.
- 17. The system recited in claim 15, further comprising means for delaying the I and Q components by approximately one sample interval and reversing the sign of the Q component to generate the second delayed and conjugated version of the I and Q components.
- 18. The system recited in claim 15, further comprising means for removing glitches caused by phase transients between symbols.
- 19. The system recited in claim 15, further comprising means for determining an optimal sample to use for determining the phase and frequency offset.
- 20. The system recited in claim 19, further comprising:
 means for calculating an amplitude for each sample in a symbol interval; and
 means for selecting the sample corresponding to the greatest amplitude as the optimal sample.
- 21. The system recited in claim 20, further comprising means for removing glitches caused by phase transients between symbols.